Distributed Energy Resources
Hands-on Training
for Federal Energy Managers

Sandia National Labs

National Renewable Energy Lab

Assisted by:

Ingersoll-Rand

Capstone

Supported by:

FEMP

Federal Energy Management Program

NREL National Renewable Energy Laboratory

Sandia National Laboratories

Purpose of Training

Goal:

- Become familiar with DER technologies

Opportunity:

- Operate various distributed resources

Disclaimer:

- No endorsements intended or implied

Course Notebook & CD

- Copies of presentations
- Sample technical manuals & bulletins
- Glossary of terms
- DER Industry Websites
- Government DER Resources
- Publications
- Staff contact info

➢ CD Web links live

Terminology

Distributed **E**nergy **R**esources

Distributed **G**eneration

Distributed **R**esources

(DER = DG = DR = Energy near the Load)

Distributed **E**nergy **T**echnologies **L**ab

- Glossary of Terms in Notebooks
- Acronyms – Please ask!

NREL National Renewable Energy Laboratory

Sandia National Laboratories

March 12 Schedule
8:30 am – 4:30 pm

Start	Finish	Topic	Tab	Speaker
8:30	8:45	Introductions		
8:45	9:00	Course Overview		Jerry Ginn
9:00	9:30	DER Operating Modes	1	Jerry Ginn
9:30	10:30	DER Technologies and Features	2	Abbas Akhil
10:30	12:00	DETL Equipment - Orientation & Safety	3	Tom Byrd
12:00	12:30	Catered Box Lunch		
12:30	1:00	Battery Charging	4	Jerry Ginn
1:00	2:30	Economic Evaluation of DER	5	Ed Henderson
2:30	2:45	Break		
2:45	3:30	Installation Considerations	6	John Stevens
3:30	4:00	Field Examples		Mike Lasky Doug Price Jim Watts
4:00	4:30	Daily Discussion and Wrap-up		
4:30		Adjourn		

March 13 Schedule
8:30 am – 4:15 pm

Start	Finish	Topic	Tab	Speaker
8:30	12:00	Operation & Maintenance (DETL hands-on)	7	Tom Byrd
12:00	12:30	Catered Box Lunch		
12:30	1:00	Energy Security and DER	8	Abbas Akhil
1:00	1:15	Break		
1:15	2:00	DER Life-Cycle-Cost-Effectiveness	9	Trina Masepohl
2:00	2:15	DD 1391 and BLCC Program Example	10	Tim Moss
2:15	2:30	Break		
2:30	3:15	Evaluating/Reporting Performance	11	John Stevens
3:15	3:45	Commissioning and Decommissioning (Acquiring and End-Of-Life Disposal)	12	Abbas Akhil
3:45	4:15	Daily Discussion and Course Evaluation		
4:15		Adjourn		

DETL Configuration

FEMP

Grid

480V Microgrid

Secure SCADA Lab

data/control

Loads (Various)

Distributed Energy Resources

Other Remote DER sites

Sandia National Laboratories

FEMP Publication: Using Distributed Energy Resources

A How-To Guide For Federal Facility Managers

Technology	Application					
	Standby Power	Low-cost Energy	Stand-alone System	Combined Heat & Power	Peak Shaving	Power Quality
Diesel Engine	✓	✓	✓	✓	✓	
Natural Gas Engine	✓	✓	✓	✓	✓	
Dual Fuel Engine	✓	✓	✓	✓	✓	
Microturbine	✓		✓	✓	✓	
Combustion Turbine	✓	✓	✓	✓	✓	
Fuel Cell			✓	✓	✓	✓
Photovoltaics		*	✓		✓	
Wind Turbine		*	✓			
Uninterruptible Power Supply (UPS)	✓					✓
Battery System	✓					✓
Flywheel						✓
Superconducting Magnetic Energy Storage (SMES)						✓
Hybrid Systems	✓	✓	✓	✓	✓	✓

* Although photovoltaics and wind turbines may not offer the lowest cost power option, their low environmental impacts greatly enhance the value of the power they provide.

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Staff

Sandia

Jerry Ginn

Abbas Akhil

Tom Byrd

John Stevens

NREL

Trina Masepohl

Energy Options

Ed Henderson

Capstone

Mike Lasky

Doug Price

Ingersoll-Rand

Jim Watts

Staff Experience

- Power Systems
- Photovoltaics
- Power Electronics Testing
- Energy Storage
- Solar Thermal
- Fuel Cell
- Microturbine Testing
- Microturbine Installation (300+)
- Fielded Systems (Federal & Private)
- Government Procurements

Staff e-mails & voice mails listed

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This Course & Other FEMP Resources are Yours

- We will help locate best resource
- Course aims to address your concerns
- Thanks for your feedback

Welcome!!

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